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A REVIEW ON COASTAL AND MARINE PROTECTED AREAS AS ECOSYSTEM BASED MANAGEMENT TOOL: GOODWILL FOR MARINE LIFE

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INTRODUCTION:

Coastal and Marine Protected Areas (CMPAs) means 'any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings' (CBD, 2004). The CMPAs are entitled to protect marine ecosystems, processes, habitats and species, which can contribute to the restoration and replenishment of resources. CMPAs can improve the health of oceans by protecting and restoring marine habitats, increasing resilience to environmental changes and protecting species and rebuilding fish stocks as Ecosystem Based Management (EBM) tool (Halpern et al., 2010 and Day et al., 2012). The well-designed networks; sustainably financed; enforcement and compliance of laws; local community engagement and integrated management plan are some of the key principles of CMPAs to work (WWF, 2014). The global target of 10% conservation of coastal and marine areas by 2020 has been agreed by CBD and SDG (OECD, 2017). In this context, India has 31 CMPAs with 106 newly considered important coastal and marine biodiversity areas (Rajagopalan, 2011). The present study attempts to understand the importance of marine protected areas as a tool for EBM with an example for benefit sharing.

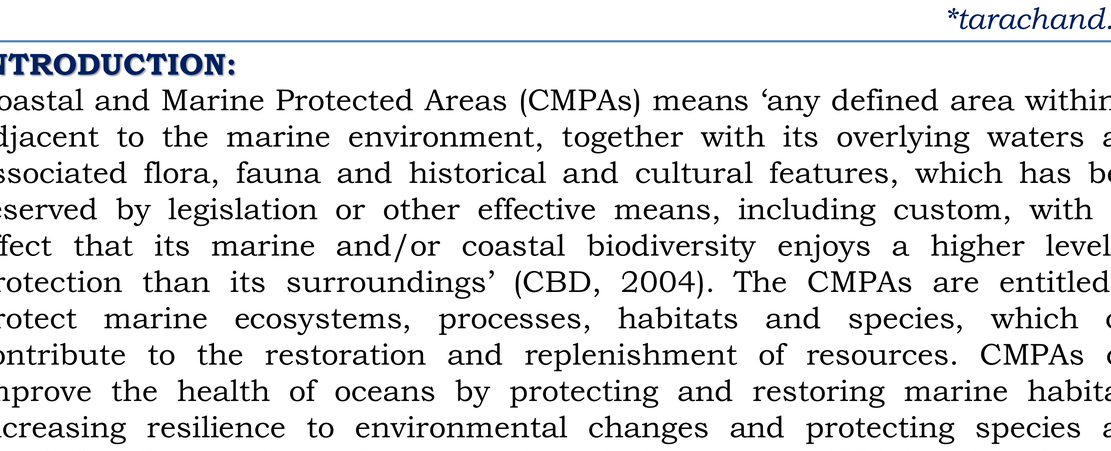


Fig. 1: Updated official map of CMPAs accounted 6.4% of the world ocean designated for protection, but only 1.89% is well managed due to international instruments)(Source: UNEP-WCMC and IUCN, 2017).

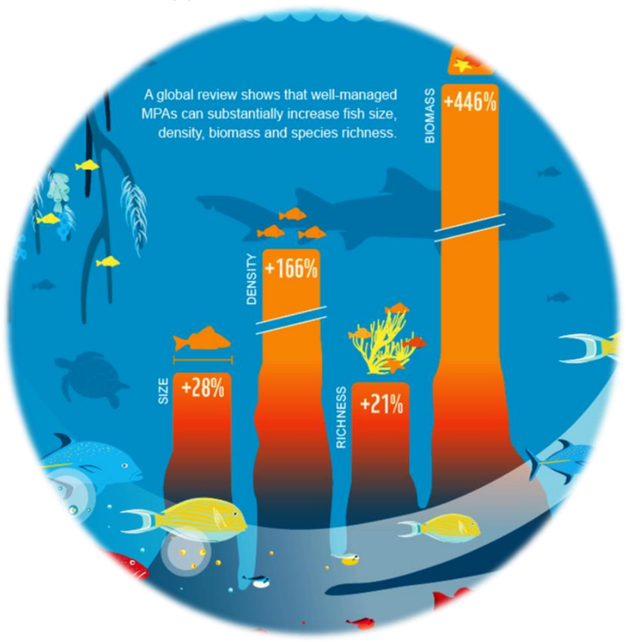


Fig. 2: Infographic represented benefits of the CMPAs (adopted from WWF, 2014).

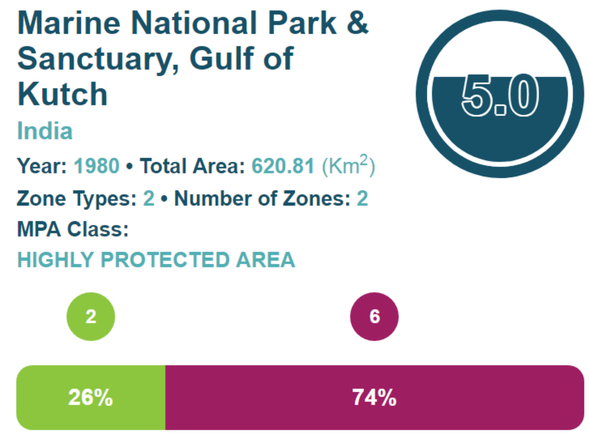
Despite an initial lag of CMPAs, there is a growing body of evidence for the EBM of resources (Fig. 1). As fish populations recover within CMPAs, juveniles and adults can spill over across the boundaries and replenish fishing grounds. Larger and older fishes in CMPAs produce more eggs. The network of small CMPAs contributes more spill over of juveniles and adults in the adjacent areas than single large CMPA of equal dimension. The global review shows that well managed CMPAs acts as goodwill for marine life and can substantially increase fish size, density, species richness and biomass (Fig.2) (WWF, 2014 & 2015).

METHODS:

A classification system of zones within CMPAs and category of protection decided based on the method followed by UNEP-WCMC & IUCN and the scores for uses weighted by their potential impact on biodiversity (Horta e Costa, et al, 2016). The typology of benefits from CMPAs used in the present study (modified after Angulo-Valdes & Hatcher, 2010) derived from the percentage input-out analysis for contribution as EBM tool by cumulative ranking of 9 categories from 0 to 10 by taking into consideration of following key principles: consider ecosystem connections; appropriate spatial & temporal scales; adaptive management; use of scientific knowledge; integrated management; stakeholder involvement; account for dynamic nature of ecosystems; ecological integrity & biodiversity; sustainability; recognize coupled social-ecological systems; decisions reflect societal choice; distinct boundaries; interdisciplinarity; appropriate monitoring; and acknowledge uncertainty (Long et al., 2015).

RESULT:

An attempt to show the benefits of CMPAs as ecosystem based management tool, India's first CMPA i.e. Marine National Park and Sanctuary, Gulf of Kutch has shown as an example here. The index for classification and category of protection comes 5.0 in the cumulative 2 zones and placed it in the category of highly protected areas based on the methodology of UNEP-WCMC & IUCN (2017).



The review presented a total of 99 benefits of CMPAs identified within nine main categories are fishery, non-fishery, management, education/research, cultural, process, ecosystem, populations and species benefits. Benefits of CMPAs derived from the percentage input-out analysis for contribution as EBM tool expressed the normalized attributes (Fig. 3).

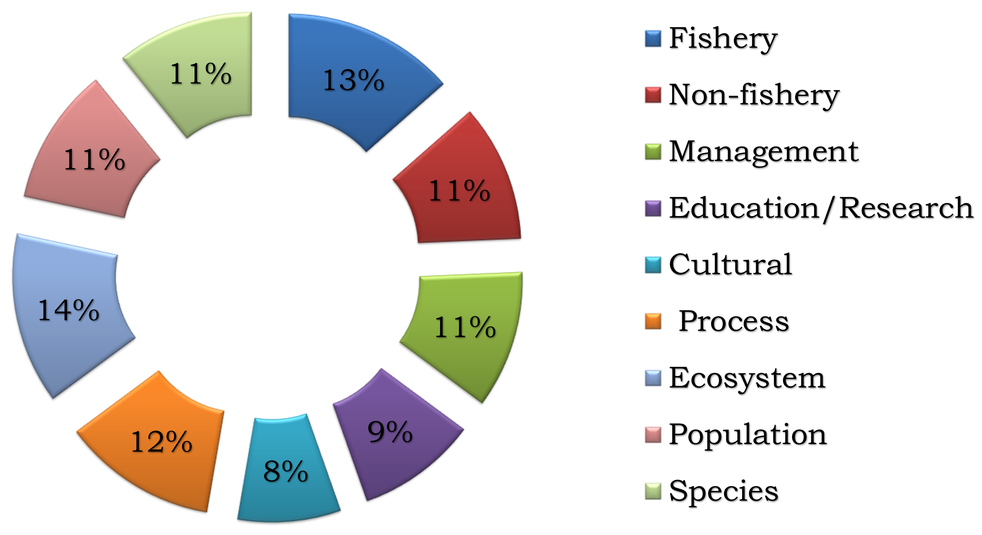


Fig. 3: Benefits of CMPAs derived from the percentage input-out analysis for contribution as EBM tool.

CONCLUSION:

This way CMPAs are working as the EBM tool providing protection to important habitats from damage by destructive fishing practices and other human activities and allowing damaged areas to recover; maintaining biodiversity and providing refuges for species; providing areas where fish are able to spawn and grow to their adult size; increasing fish catches in surrounding fishing grounds; building resilience to climate change; helping to maintain local cultures, economies, and livelihoods; serving as benchmarks for undisturbed, natural ecosystems, which can be used to measure the effects of human activities in other areas, and thereby help to improve ecosystem management. There is a need to work with fishers, local communities and other resources users for implementing best management practices in CMPAs.

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